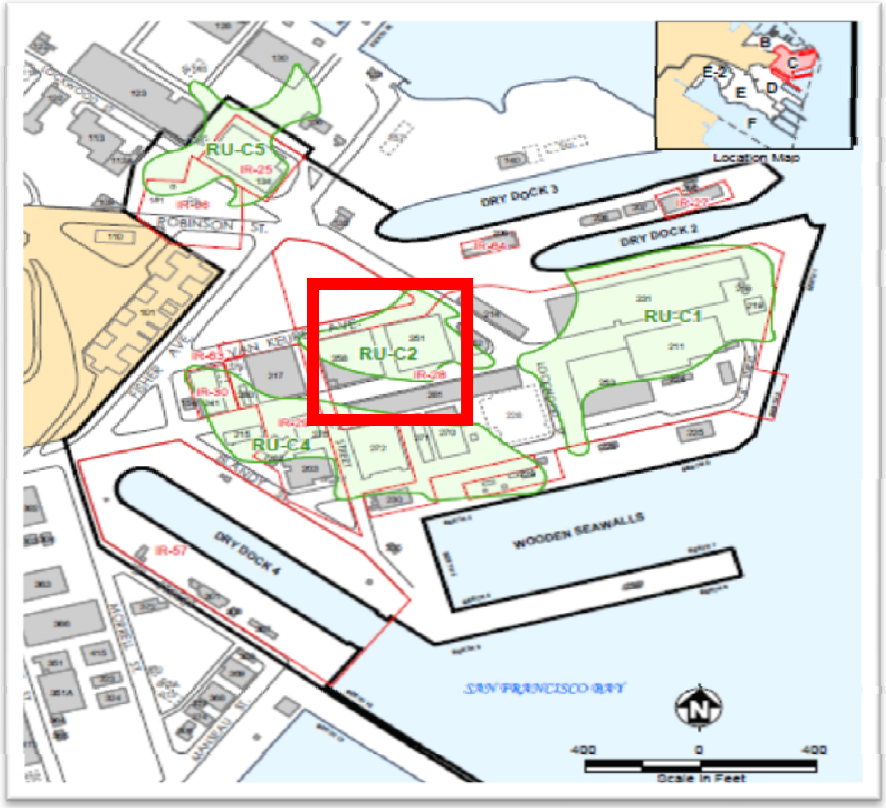
RU-C2 Pre-Design
PARCEL C

Hunters Point Shipyard
February 2012

Contract No. N62473-06-D-2206
Delivery Order No. 0093

RU-C2 Overview

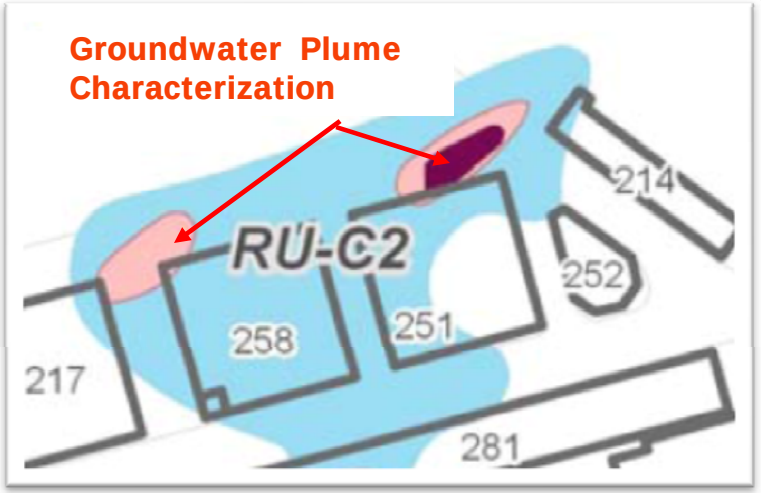
- RU-C2: Located west of RU-C1 and north of RU-C4
- Key Features- Buildings 258 and 251
- Two VOC plumes in groundwater
- Primary Groundwater COCs- TCE, PCE, chlorobenzenes

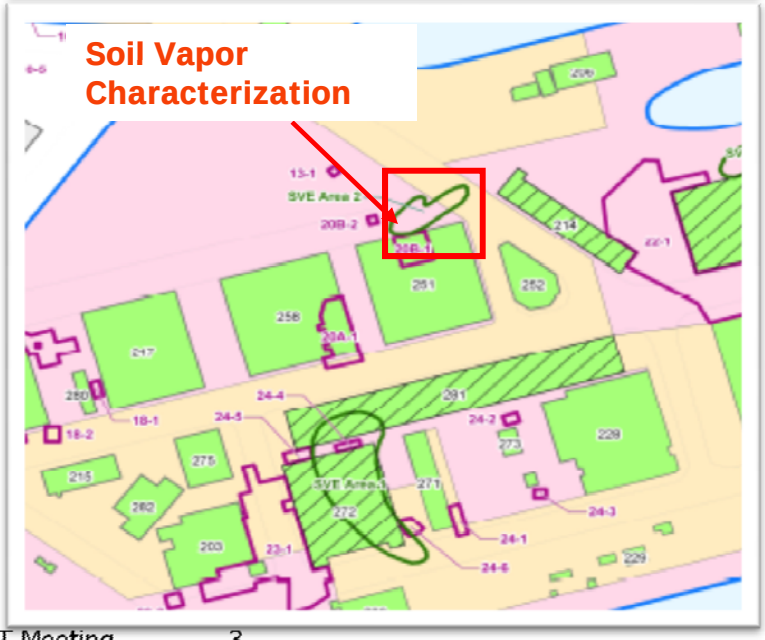


RU-C2 Location Map

Pre-Design Investigation Activities-2012

- Pre-Design Investigation Purpose
  - Soil and grab groundwater investigation- VOC plume characterization in support of in-situ remediation
  - Soil vapor investigation- Define area warranting soil vapor extraction (SVE)





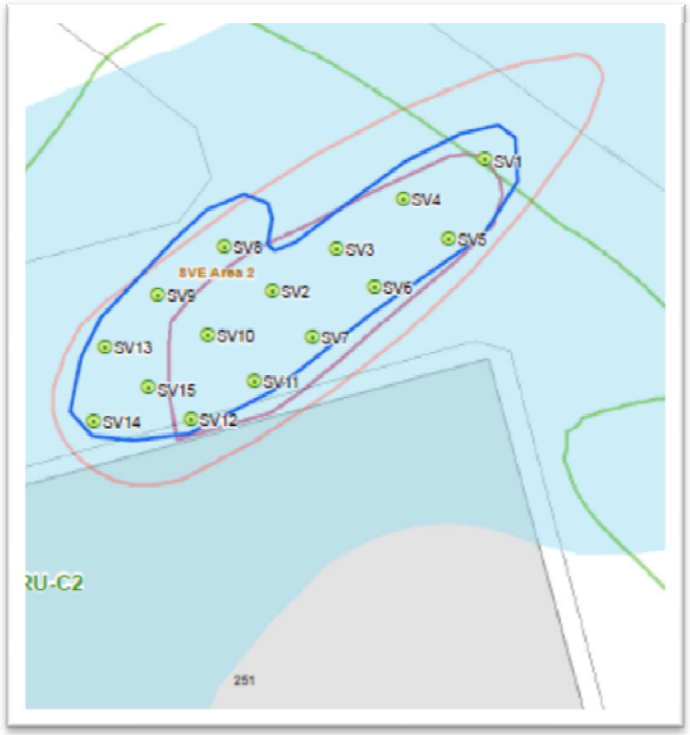
Pre-Design Investigation Activities-2012

- Soil and Soil Vapor Characterization

- Completed to Date:
  - 15 temporary vapor probes installed
  - Soil samples collected from 2 and 5 feet bgs;
  - Submitted soil samples to laboratory
    - USEPA Method 8260

- To be Completed:
  - Collect 15 vapor samples from 5 feet bgs
    - Week of February 20th, 2012
  - TO-15 analysis of vapor samples
  - Analysis of soil samples
    - Week of February 20th

Building 251 Soil Vapor Remediation Area



Pre-Design Investigation Activities-2012

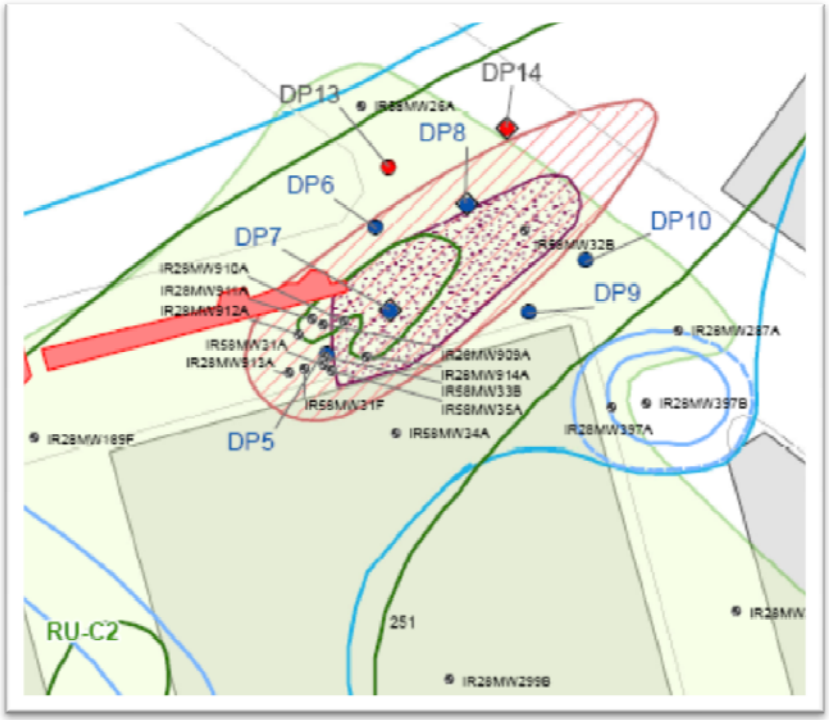
Building 251 VOC Remediaton Area

- Completed to Date:
  - 6 Tier I hydropunches targeting Building 251 plume
  - 2 Tier II step-out hydropuches per TRIAD discussions
  - Soil and grab groundwater sampling
  - Analysis for VOCs
- To Be Completed:
  - Tier II sample analysis
  - Bio-indicator analysis at 5 locations

(dissolved gasses, alkalinity, anions, sulfide, and DHC)

- Monday, February 27th, 2012

Building 251 VOC Remediation Area



Pre-Design Investigation Activities-2012

Tier I Groundwater Sample Results
Building 251 VOC Remediation Area

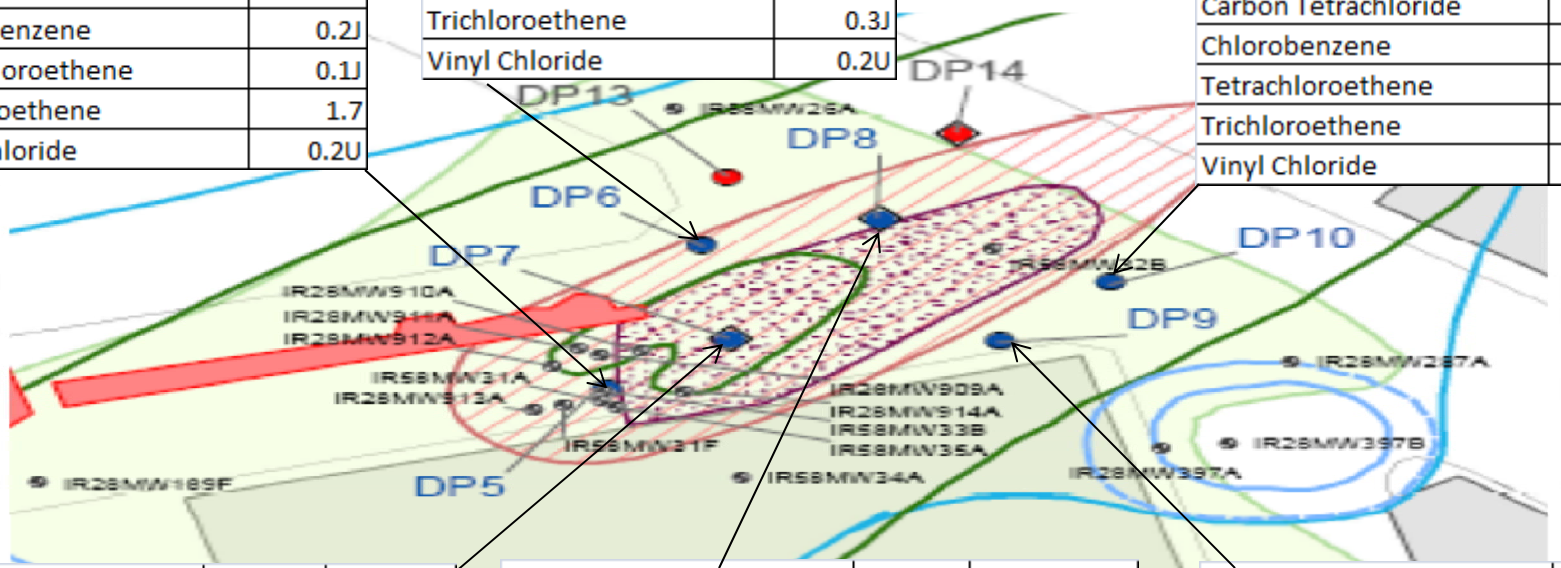
Analyte	PAL		LOQ	Building 258 - Residential PAL							
	Residential[1]	Industrial[2]		DP-5-20	DP-6-20	DP-7-20	DP-7-33	DP-8-20	DP-8-37 / FD	DP-9-20	DP-10-20
1,1,2,2-Tetrachloroethane	3	5.1	0.5	0.1U	0.1U	0.5U	0.1U	0.3U	0.1U	0.1U	0.1U
1,2,4-trimethylbenzene	25	25	0.5	0.1U	0.1U	26	0.3J	0.2U	0.1U	0.2U	0.1U
1,2-Dichloroethene (total)	210	210	0.5	0.5	0.1U	4.9	0.1U	2.6	3.8 / 4.1	24.3	1.5
1,2-Dichloropropane	1.1	1.8	0.5	0.1U	0.1U	0.5U	0.1U	0.2U	0.1U	0.2U	0.1U
1,3,5-trimethylbenzene	19	19	0.5	0.1U	0.1U	2.5J	0.1U	0.1U	0.1U	0.1U	0.1U
1,4-Dichlorobenzene	2.1	3.6	0.5	0.1U	34	130	0.1U	15	1 / 0.9	1.6	0.1U
Benzene	0.5	0.6	0.5	0.1U	0.1J	3	0.1U	0.1U	0.1U	0.2J	0.1U
Bromodichloromethane	1	1.7	0.5	0.1U	0.1U	0.5U	0.1U	0.1U	0.1U	0.1U	0.1U
Carbon Tetrachloride	0.5	0.5	0.5	0.1U	0.1U	0.5U	1.2	0.1U	0.1U	0.1U	0.1U
Chlorobenzene	390	390	0.5	0.2J	76	730	1.2	12	0.8 / 0.8	59	0.1U
Chloroethane	6.5	NA	1	0.2U	0.2U	0.9U	0.2U	0.2U	0.2U	0.2U	0.2U
Chloroform	0.7	1.2	0.5	1.2	0.1U	0.6U	0.7	0.1U	0.1U	0.1U	0.1U
cis-1,2-Dichloroethene	210	210	0.5	0.5	0.1U	4.9	0.1U	2.5	3.8 / 4.1	24	1.5
cis-1,3-Dichloropropene	0.5	0.5	0.5	0.1U	0.1U	0.5U	0.1U	0.1U	0.1U	0.1U	0.1U
Dibromochloromethane	2.6	NA	0.5	0.1U	0.1U	0.5U	0.1U	0.1U	0.1U	0.1U	0.1U
Isopropylbenzene	7.8	7.8	0.5	0.1U	0.1U	3.1	0.1U	0.2J	0.1U	0.1U	0.1U
Methylene Chloride	27	46	5	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U
Naphthalene	3.6	6	2	0.1U	0.1U	8.5J	0.1U	0.1U	0.1U	0.1U	0.1U
Tetrachloroethene	0.5	0.9	0.5	0.1J	0.3J	1.0J	0.1U	2.2	29 / 29	9	0.1U
trans-1,3-Dichloropropene	0.5	0.5	0.5	0.1U	0.1U	0.5U	0.1U	0.1U	0.1U	0.1U	0.1U
Trichloroethene	2.9	4.8	0.5	1.7	0.3J	0.6U	0.1U	1	1 / 1.1	5.6	0.4J
Trichlorofluoromethane	180	180	1	3.6	0.1U	0.6U	0.1J	0.2U	0.5J / 0.5J	0.2U	0.1J
Vinyl Chloride	0.5	0.5	0.5	0.2U	0.2U	0.8U	0.2U	0.1U	0.2U	2.4	0.2U

Pre-Design Investigation Activities-2012 Preliminary Findings

Analyte	DP-6-20
1,4-Dichlorobenzene	34
Carbon Tetrachloride	0.1U
Chlorobenzene	76
Tetrachloroethene	0.3J
Trichloroethene	0.3J
Vinyl Chloride	0.2U

Analyte	DP-5-20
1,4-Dichlorobenzene	0.1U
Carbon Tetrachloride	0.1U
Chlorobenzene	0.2J
Tetrachloroethene	0.1J
Trichloroethene	1.7
Vinyl Chloride	0.2U

Analyte	DP-10-20
1,4-Dichlorobenzene	0.1U
Carbon Tetrachloride	0.1U
Chlorobenzene	0.1U
Tetrachloroethene	0.1U
Trichloroethene	0.4J
Vinyl Chloride	0.2U



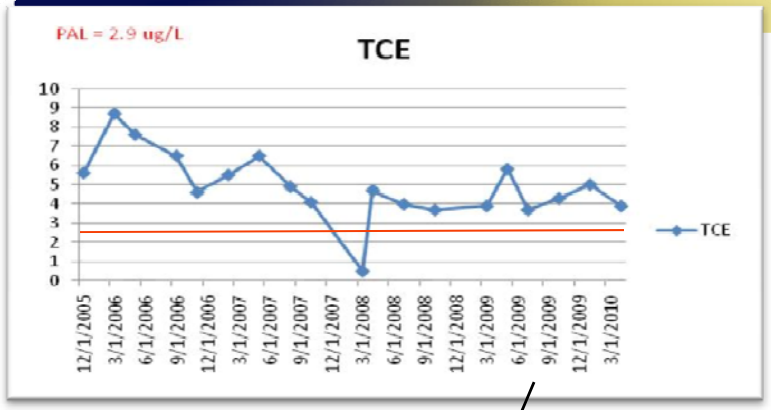
Analyte	DP-7-20	DP-7-33
1,4-Dichlorobenzene	130	0.1U
Carbon Tetrachloride	0.5U	1.2
Chlorobenzene	730	1.2
Tetrachloroethene	1.0J	0.1U
Trichloroethene	0.6U	0.1U
Vinyl Chloride	0.8U	0.2U

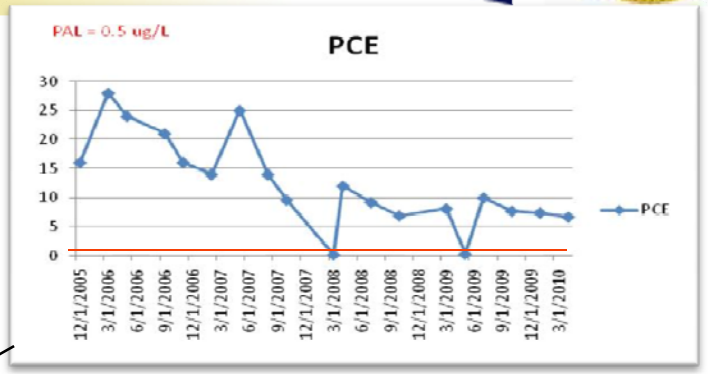
Analyte	DP-8-20	DP-8-37 /FD
1,4-Dichlorobenzene	15	1 / 0.9
Carbon Tetrachloride	0.1U	0.1U
Chlorobenzene	12	0.8 / 0.8
Tetrachloroethene	2.2	29 / 29
Trichloroethene	1	1 / 1.1
Vinyl Chloride	0.1U	0.2U

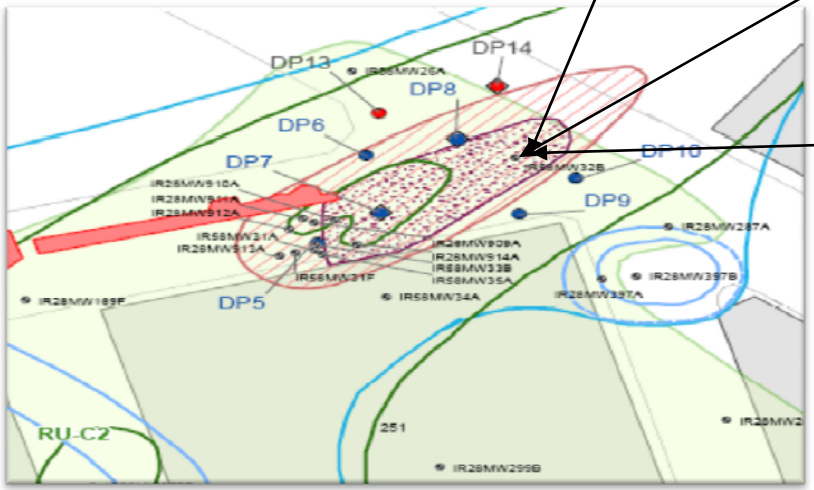
Analyte	DP-9-20
1,4-Dichlorobenzene	1.6
Carbon Tetrachloride	0.1U
Chlorobenzene	59
Tetrachloroethene	9
Trichloroethene	5.6
Vinyl Chloride	2.4

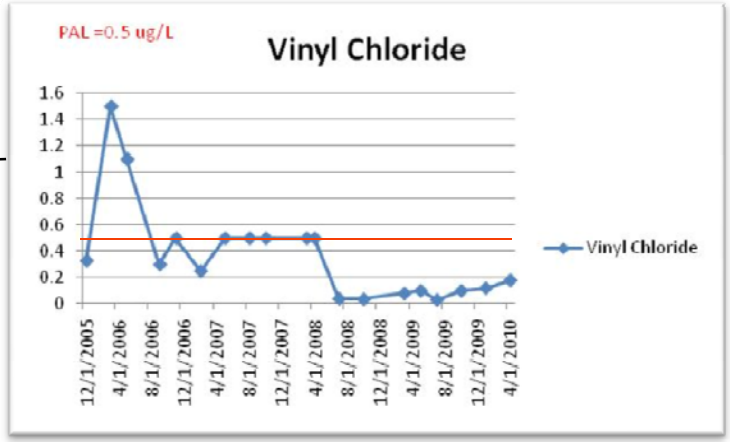
Building 251 VOC Remediation Area

IR58MW32B

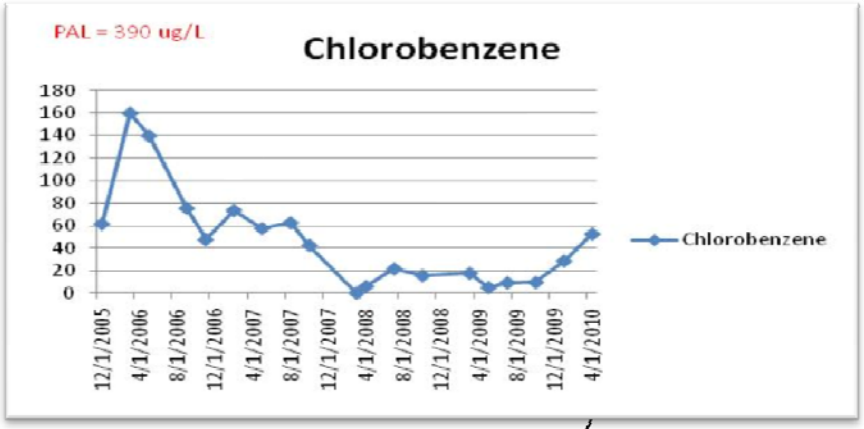

PAL = 2.9 ug/L
TCE
10
9
8
7
6
5
4
3
2
1
0
12/1/2005
3/1/2006
6/1/2006
9/1/2006
12/1/2006
3/1/2007
6/1/2007
9/1/2007
12/1/2007
3/1/2008
6/1/2008
9/1/2008
12/1/2008
3/1/2009
6/1/2009
9/1/2009
12/1/2009
3/1/2010
TCE

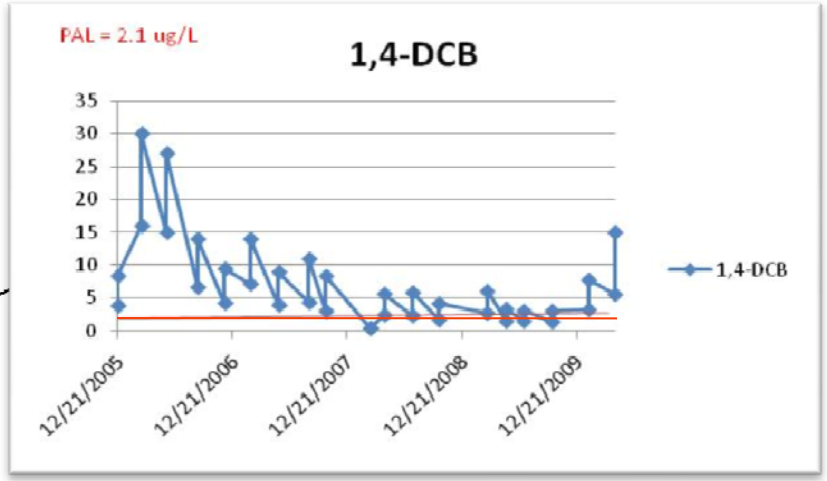

PAL = 0.5 ug/L
PCE
30
25
20
15
10
5
0
12/1/2005
3/1/2006
6/1/2006
9/1/2006
12/1/2006
3/1/2007
6/1/2007
9/1/2007
12/1/2007
3/1/2008
6/1/2008
9/1/2008
12/1/2008
3/1/2009
6/1/2009
9/1/2009
12/1/2009
3/1/2010
PCE

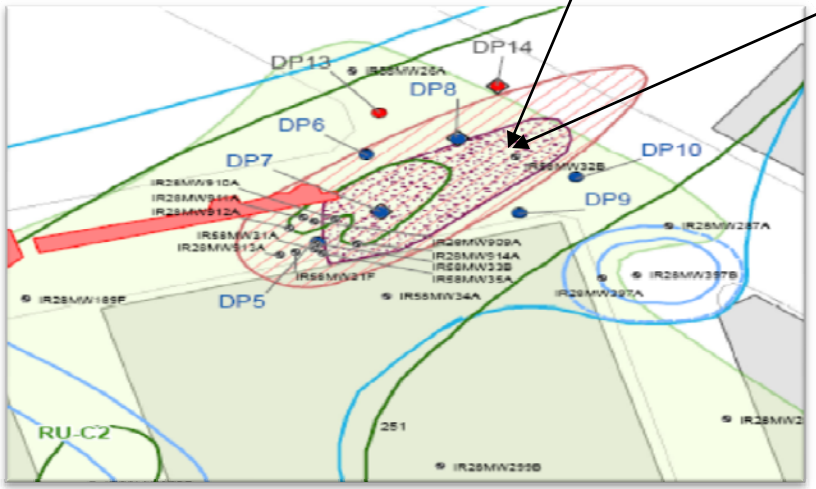

DP13
DP14
DP8
DP6
DP7
DP10
DP9
DP5
IR28MW32B
IR28MW397A
IR28MW397B
IR28MW299B
RU-C2
251


PAL =0.5 ug/L
Vinyl Chloride
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
12/1/2005
4/1/2006
8/1/2006
12/1/2006
4/1/2007
8/1/2007
12/1/2007
4/1/2008
8/1/2008
12/1/2008
4/1/2009
8/1/2009
12/1/2009
4/1/2010
Vinyl Chloride

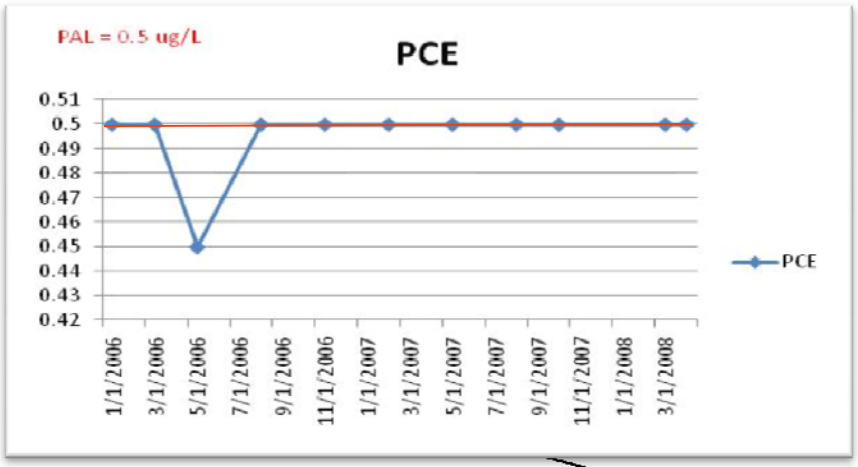
IR58MW32B

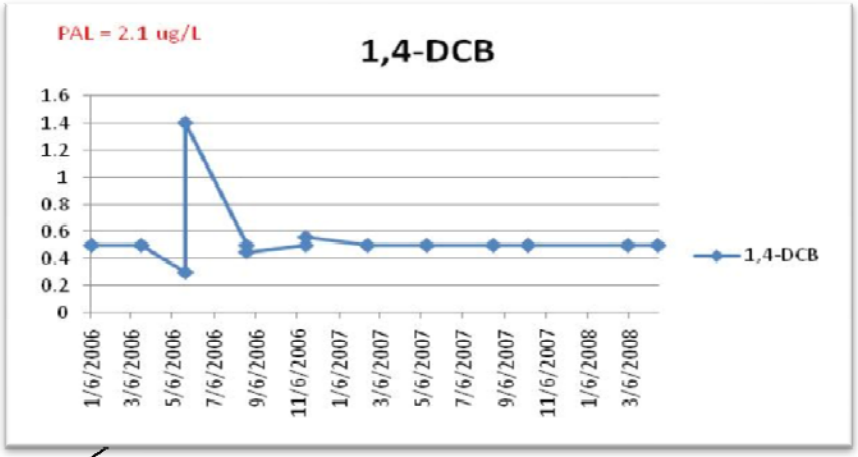

PAL = 390 ug/L
Chlorobenzene
180
160
140
120
100
80
60
40
20
0
12/1/2005
4/1/2006
8/1/2006
12/1/2006
4/1/2007
8/1/2007
12/1/2007
4/1/2008
8/1/2008
12/1/2008
4/1/2009
8/1/2009
12/1/2009
4/1/2010
Chlorobenzene

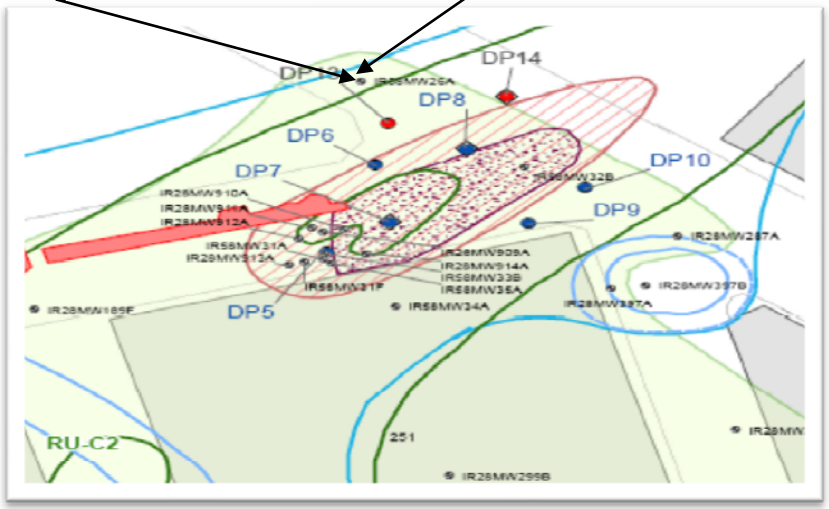

PAL = 2.1 ug/L
1,4-DCB
35
30
25
20
15
10
5
0
12/21/2005
12/21/2006
12/21/2007
12/21/2008
12/21/2009
1,4-DCB


DP13
DP14
DP8
DP6
DP7
DP10
DP9
DP5
IR58MW32B
RU-C2
251

IR58MW26A


PAL = 0.5 ug/L
PCE
0.51
0.5
0.49
0.48
0.47
0.46
0.45
0.44
0.43
0.42
1/1/2006
3/1/2006
5/1/2006
7/1/2006
9/1/2006
11/1/2006
1/1/2007
3/1/2007
5/1/2007
7/1/2007
9/1/2007
11/1/2007
1/1/2008
3/1/2008
PCE


PAL = 2.1 ug/L
1,4-DCB
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1/6/2006
3/6/2006
5/6/2006
7/6/2006
9/6/2006
11/6/2006
1/6/2007
3/6/2007
5/6/2007
7/6/2007
9/6/2007
11/6/2007
1/6/2008
3/6/2008
1,4-DCB

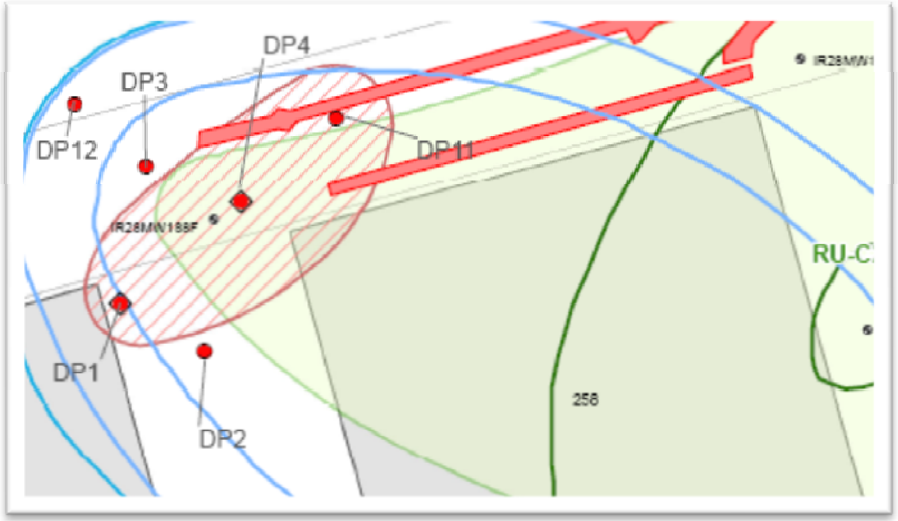

DP14
DP8
DP6
DP7
DP10
DP9
DP5
RU-C2
251

Pre-Design Investigation Activities-2012

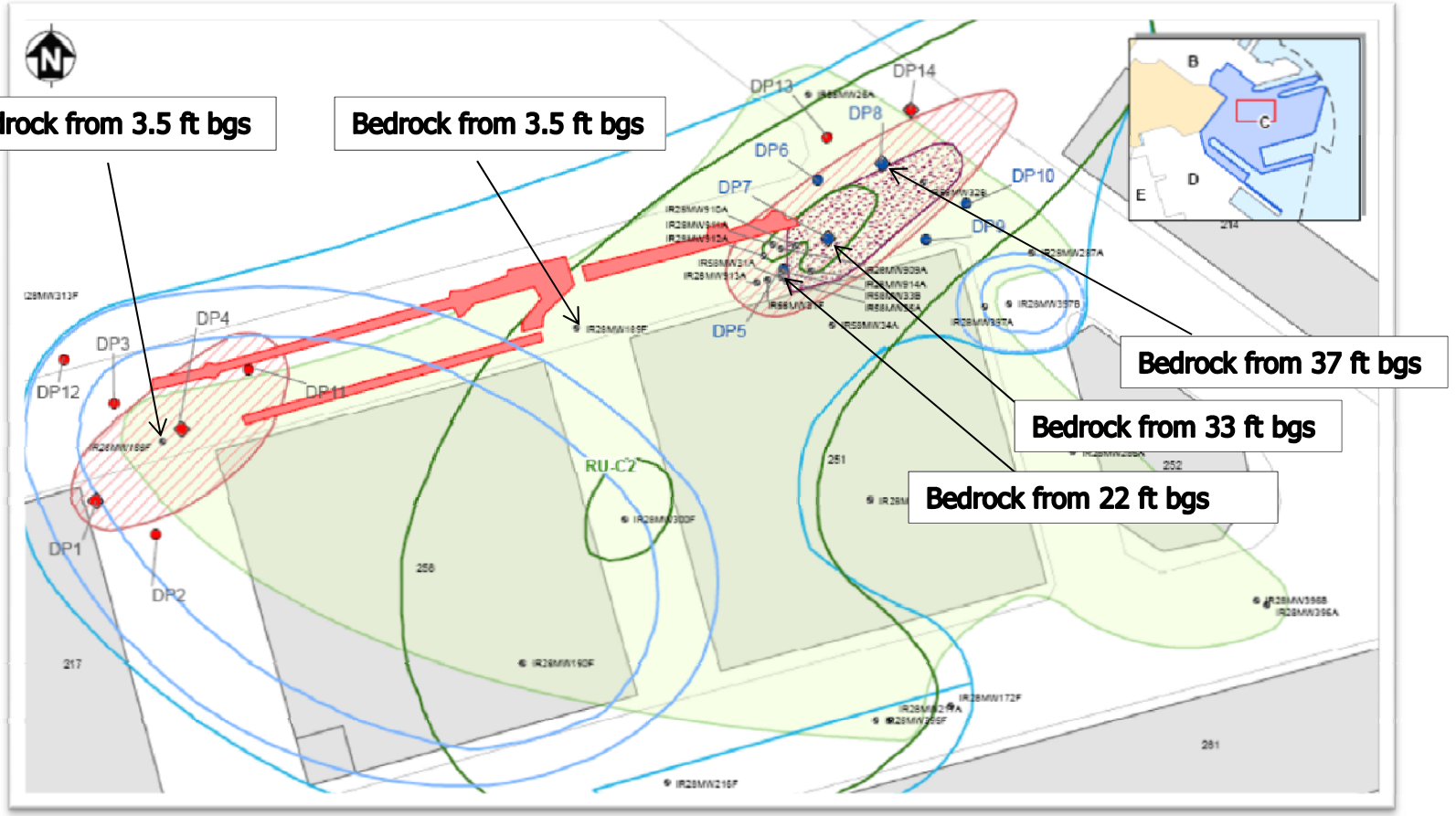
Building 258 VOC Remediation Area

- DP1 through DP4 encountered competent bedrock (serpentine) at 3 feet bgs

Building 258 VOC Remediation Area



Occurrence of Bedrock



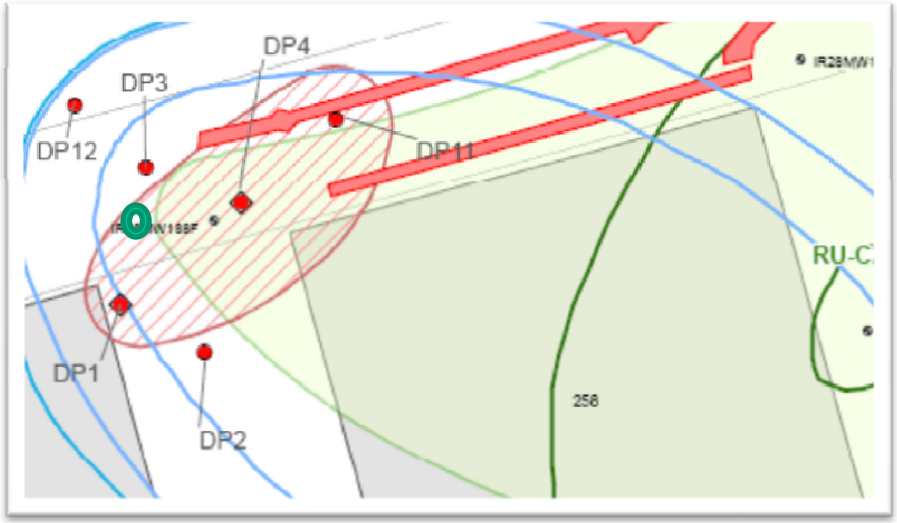
Bedrock Formation at Bldg. 258 Trench

Pre-Design Investigation Activities-2012

Well IR28MW188F

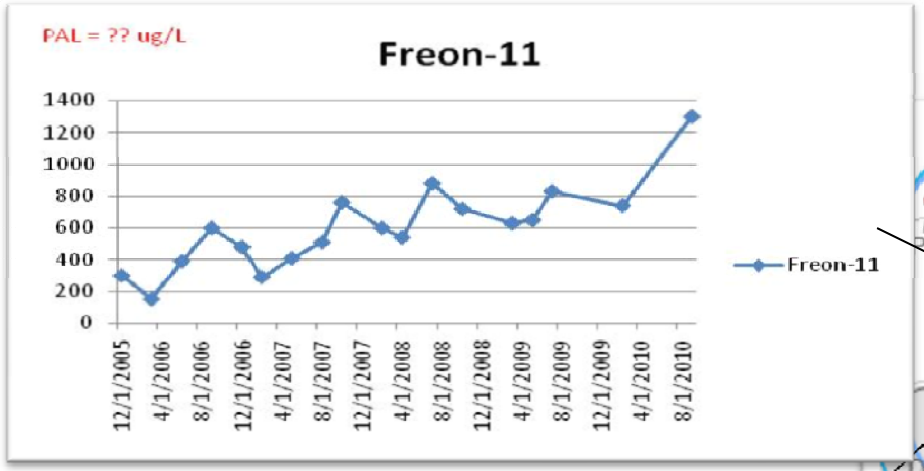
- Screened from 8 to 22 ft bgs in bedrock (serpentine)
- Primary COCs (2005-2010)
  - Carbon Tetrachloride: (23 to 51 ug/L)
  - Chloroform: (2.3 to 4.4 ug/L)
  - Freon-11 (150 to 1300 ug/L)

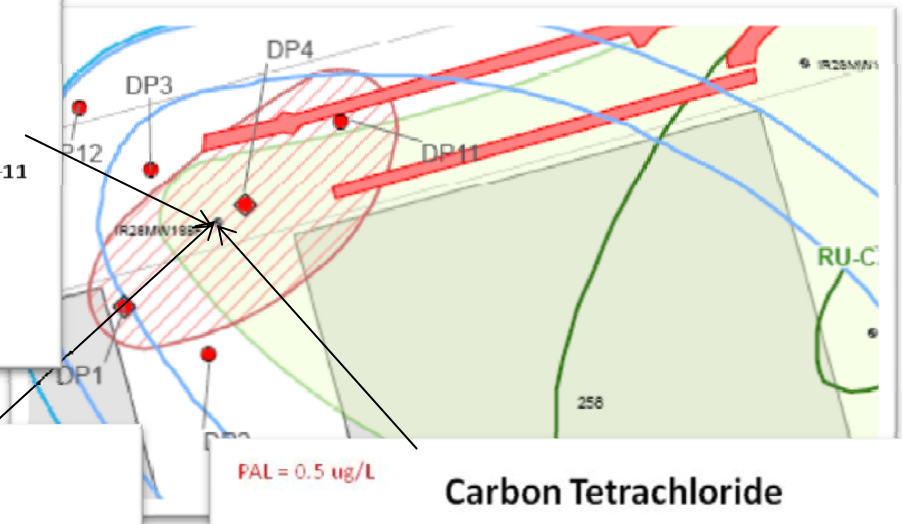
Building 258 VOC Remediation Area

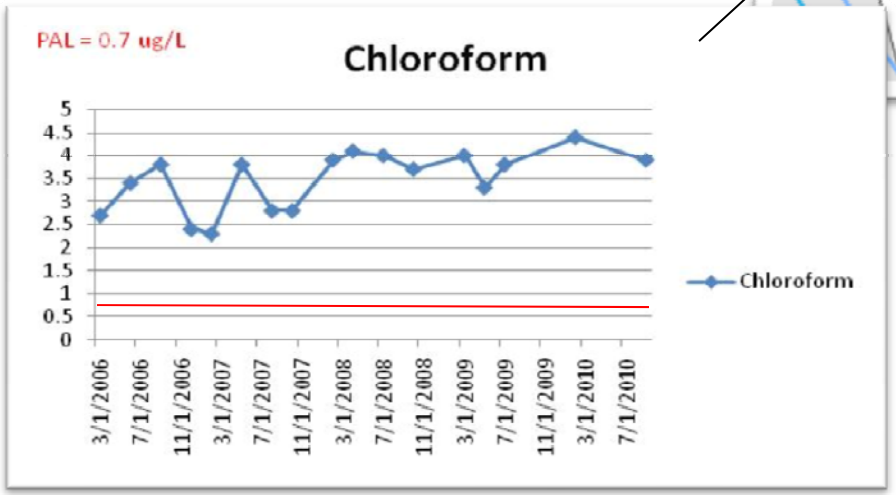


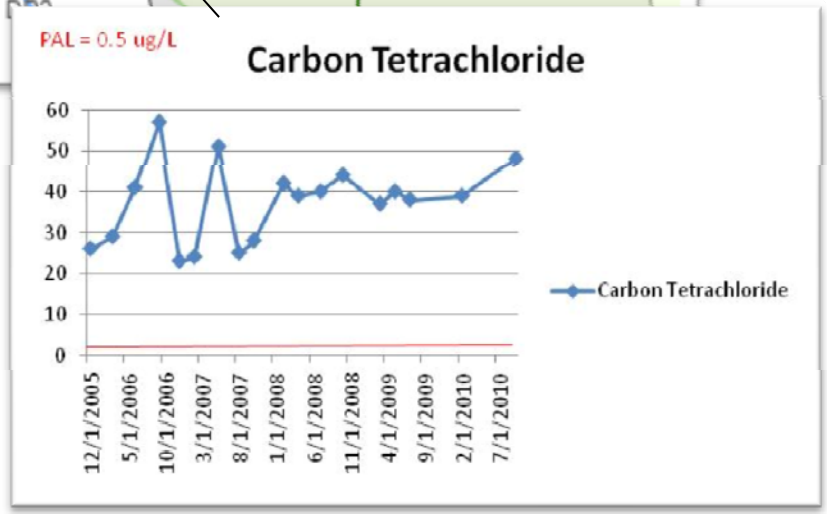
Pre-Design Investigation Activities-2012

Building 258 VOC Remediation Area









Next Steps ?

- Possible next steps at Building 258
- Air rotary rig to penetrate bedrock
  - Access limited by open trenches
  - Practicality of further characterization in bedrock
  - Feasibility of remediation in bedrock
    - Significant limitations to in-situ bioremediation in bedrock
- Conduct soil vapor sampling in the area of Building 258 to characterize soil vapor risk.
  - Would replace DPT points for soil and groundwater with soil vapor points

Estimated Schedule

- Pre-Design Investigation Technical Memorandum
  - March/April 2012
  - Pre-Design Investigation at RU-C1, C4, and C5 – February 2012 to March 2012
  - RU-C1, C4, and C5 Technical Memorandum – April 2012
- Remedial Design for Parcel C
  - June 2012
- Remedial Action Work Plan
  - September 2012
- Remedial Action
  - December 2012

Other Activities at Parcel C